**5.** The equation for the function in Problem 3 is $f(x) = x^3 + 6x^2 - 13x - 42$ for $-6 \le x \le 4$. Plot the function as $f_1(x)$ on your grapher. Plot $f_2(x) = f_1(\,|x|\,)$ using thick style. Does the result confirm your answer to Problem 3, part d?

**6.** The equation for the function in Problem 4 is $f(x) = -3 + \sqrt{25 - (x-2)^2}$ for $-3 \le x \le 7$. Plot the function as $f_1(x)$ on your grapher. Plot $f_2(x) = f_1(\,|x|\,)$ using thick style. Does the result confirm your answer to Problem 4, part d?

**7.** *Absolute Value Transformations Problem:* Figure 1-6h shows the graph of $f(x) = 0.5(x-2)^2 - 4.5$ in the domain $-2 \le x \le 6$.

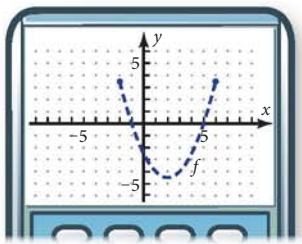


*Figure 1-6h*

**a.** Plot the graph of $f_1(x) = f(x)$. On the same screen, plot $f_2(x) = |f(x)|$ using thick style. Sketch the result and describe how this transformation changes the graph of *f*.

**b.** Deactivate $f_2(x)$. On the same screen as $f_1(x)$, plot the graph of $f_3(x) = f(\,|x|\,)$ using thick style. Sketch the result and describe how this transformation changes the graph of *f*.

**c.** Use the equation for function *f* to find the value of $|f(3)|$ and the value of $f(\,|-3|\,)$. Show that both results agree with your graphs in parts a and b. Explain why $-3$ is in the domain of $f(\,|x|\,)$ even though it is not in the domain of *f* itself.

**d.** Figure 1-6i shows the graph of a function *g*, but you don't know the equation for the function. On a copy of this figure, sketch the graph of $y = |g(x)|$, using the conclusion you reached in part a. On another copy of this figure, sketch the graph of $y = g(\,|x|\,)$, using the conclusion you reached in part b.

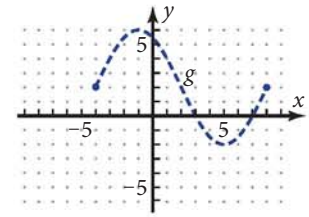


*Figure 1-6i*

**8.** *Displacement vs. Distance Absolute Value Problem:* Calvin's car runs out of gas as he is going uphill. He continues to coast uphill for a while, stops, then starts rolling backward without applying the brakes. His displacement, *y*, in meters, from a gas station on the hill as a function of time, *x*, in seconds, is given by

$$y = -0.1x^2 + 12x - 250$$

**a.** Plot the graph of this function. Sketch the result.

**b.** Find Calvin's displacement at 10 s and at 40 s. What is the real-world meaning of his negative displacement at 10 s?

**c.** What is Calvin's distance from the gas station at times $x = 10$ s and $x = 40$ s? Explain why both values are positive.

**d.** Define Calvin's distance from the gas station. Sketch the graph of distance versus time.

**e.** If Calvin keeps moving as indicated in this problem, when will he pass the gas station as he rolls back down the hill?

**9.** *Even Function and Odd Function Problem:* Figure 1-6j shows the graph of the even function $f(x) = x^4 - 3x^2 - 4$. Figure 1-6k on the next page shows the graph of the odd function $g(x) = x^5 - 6x^3 + 6x$.

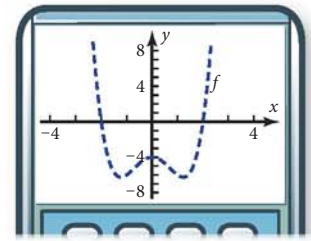


*Figure 1-6j*